

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.

## PATENT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents  
United States Patent and Trademark  
Office  
Box PCT  
Washington, D.C. 20231  
ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

<b>Date of mailing</b> (day/month/year) 28 February 2000 (28.02.00)	
<b>International application No.</b> PCT/EP99/04560	<b>Applicant's or agent's file reference</b> PCT-1044-009/co
<b>International filing date</b> (day/month/year) 01 July 1999 (01.07.99)	<b>Priority date</b> (day/month/year) 02 July 1998 (02.07.98)
<b>Applicant</b> JACOBSEN, Claus, J., H. et al	

1. The designated Office is hereby notified of its election made:



in the demand filed with the International Preliminary Examining Authority on:

19 January 2000 (19.01.00)



in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

<p>The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No.: (41-22) 740.14.35</p>	<p>Authorized officer C. Villet</p> <p>Telephone No.: (41-22) 338.83.38</p>
--	---

# PATENT COOPERATION TREATY

## PCT

15

REC'D 30 OCT 2000	
WIPO	PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>PCT-1044-009/co</b>	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. <b>PCT/EP99/04560</b>	International filing date (day/month/year) <b>01/07/1999</b>	Priority date (day/month/year) <b>02/07/1998</b>
International Patent Classification (IPC) or national classification and IPC <b>C01C1/04</b>		
Applicant <b>HALDOR TOPS E A/S et al.</b>		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
  
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
 

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:
 

I    ☒ Basis of the report

II   ☐ Priority

III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

IV ☐ Lack of unity of invention

V    ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

VI ☐ Certain documents cited

VII ☒ Certain defects in the international application

VIII ☒ Certain observations on the international application

Date of submission of the demand  <b>19/01/2000</b>	Date of completion of this report  <b>25.10.2000</b>
Name and mailing address of the international preliminary examining authority: <div style="display: flex; align-items: center;"> <div>             European Patent Office - P.B. 5818 Patentlaan 2              NL-2280 HV Rijswijk - Pays Bas              Tel. +31 70 340 - 2040 Tx: 31 651 epo nl              Fax: +31 70 340 - 3016           </div> </div>	Authorized officer  <b>Zalm, W</b>  Telephone No. +31 70 340 2804



**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/EP99/04560

**I. Basis of the report**

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

**Description, pages:**

1-3 as originally filed

**Claims, No.:**

1-3 as received on 27/07/2000 with letter of 26/07/2000

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes:	Claims 1-3
	No:	Claims
Inventive step (IS)	Yes:	Claims
	No:	Claims 1-3
Industrial applicability (IA)	Yes:	Claims 1-3
	No:	Claims

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/EP99/04560

---

**2. Citations and explanations**

**see separate sheet**

**VII. Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:

**see separate sheet**

**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**Re Item V**

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement:

(a) Reference is made to the following documents:

D1: DE-A-2019706

D2: GB-A-2077613

D3: XP002119097 (&SU-A-321045)

(b) The present application does not satisfy the criterion set forth in Article 33(3) PCT because the subject-matter of **claims 1-3** does not include an inventive step as defined in the regulations (Rule 65 PCT).

Document D1 describes the preparation of ammonia from hydrogen and nitrogen in presence of a catalyst arranged in a fixed bed and at high pressures (see claim 1). The gas stream flows in a radial mode through the bed. At page 9, last paragraph it is noticed that the particles can have a relative (-for such radial beds-) small diameter: 1 to 3 mm. The process of (amended) claim 1 of the application under consideration differs from this teaching in that (in addition, see item VIII below) particles in the range 0.2-1.5 mm are present in the catalyst bed in about equal amounts in the adjacent size-ranges 0.3-0.8 mm and 0.8-1.5 mm. This feature is considered to result in a higher ammonia product yield (because of an improved flow distribution of the gas through the bed; see page 1, last paragraph of the description).

Document D3 teaches that in a fixed ammonia synthesis bed the yield can be increased by making use of a catalyst consisting of coarse and small sized (0.5-1.0 mm) particles. The small sized fraction of the catalyst bed of D3 falls within the two ranges as specified in claim 1 of the application under consideration.

With regard to the argument that the catalyst would be present in the reactor in a fluidized state the following is noticed. Although in the title of the abstract the expression 'fluidized bed catalyst' is indeed used it is mentioned in the abstract that the coarse particles are in a stationary condition whereas the small-sized particles move into the spaces between these coarse particles (see title). The expression 'fluidized bed' should thus be understood as referring to part of the catalyst particles of a bed which as such is static (fixed). A better

expression thus would be 'pseudo-fluidized bed' (this wording is used in the original document). The objectives of the two-size beds disclosed by D3 are similar to those of the process of the present application (increased conversion and less energy consumption). The addition of particles of these sizes (0.5-1.0 mm) to the catalyst known from D1 (1-3 mm) thus appears an obvious measure in order to solve the problem of product yield. The subject-matter of claim 1 is therefore regarded to lack an inventive step.

It is not apparent which part of the application could serve as a basis for a new claim which would satisfy the criteria set forth in Article 33(1) PCT.

**Re Item VII**

Certain defects in the international application:

The **documents D1, D2 and D3** have not been identified in the description nor has the relevant background art disclosed therein been discussed. The requirements of Rule 5.1(a)(ii) PCT are, thus, not fulfilled.

**Re Item VIII**

Certain observations on the international application:

The application does not meet the requirements of Article 6 PCT because the subject-matter of **claims 1 and 2** is not clear.

Claim 1 defines a catalyst composition by the volume ratio of three size ranges present in the powder mixture. The particles in the two lower ranges should each be present in an amount of at least 10% of the mixture. According to claim 2 however the bed contains at least 10 volume-% of the particles in the two lower ranges taken together (claim 2: 'having a size between 0.2 and 1.5 mm').

In case of the argumentation that in addition to the catalyst particles in the three ranges of claim 1 other material is present (so that the two small sized ranges only sum up to less than 10 volume-% of the total including the other material) it appears that the definition of the bed composition is indefinite and should be objected under Article 6 PCT.

**International Patent Application No. PCT/EP99/04560**  
**Applicant: HALDOR TOPSOE A/S**  
**PCT 1044-00993/Ih**  
**Date: July 26, 2000**

**NEW CLAIMS 1 TO 3**

1. Process for the preparation of ammonia by contacting an ammonia synthesis gas with ammonia catalyst particles arranged in a fixed bed comprising catalyst particles with a particle size in the range of  $\geq 0.2$  mm to  $< 1.5$  mm, wherein the fixed bed contains a mixture of catalyst particles with a size of 1.5 - 3.0 mm, 0.8 - 1.5 mm and 0.3 - 0.8 mm in a volume ratio of (40 - 70):(10 - 40):(10 - 30).
2. The process of claim 1, wherein the fixed bed contains at least 10% by volume of catalyst particles having a particle size in the range of  $\geq 0.2$  mm to  $< 1.5$  mm.
3. The process of claim 1 or 2, wherein the synthesis gas is passed in radial direction through the fixed bed.